997214

29 September 1965

MEMORANDUM FOR THE RECORD

SUBJECT: Precis of Reversal Processing Study PAR 206

There are several techniques available for producing reversal effects in photographic materials; this study is concerned primarily with the chemical, and the re-exposure methods. In some reproduction applications, reversal processing can achieve increased resolution in duplicate copies by eliminating certain printing operations; e.g., second generation reversal duplicate negatives have significantly higher resolving power than duplicate negatives produced in the conventional manner. Where interpretation can be confined to the use of a single positive record, the maximum information is made available by reversal processing the original camera film, which in general is substantially superior to second generation duplicate positives.

In general the study was confined to high definition aerial films and to fine grain aerial duplicating films.

The processing results were evaluated by analysis of sensitometric curves and by resolution values as shown by analysis of resolution targets resulting from exposure of 800 line/mm (1000:1) high contrast targets; the processing condition which produced the maximum value of resolving power was selected as the most desirable method. Tests were also made of the ultra violet enhancement technique, e.e., exposure of the latent image by UV light through the base to cause a bleach out during development of the silver halide in contact with the base. The films tested for reversal processing were emulsion No. 4400, 4401, 4404, and 8430; some preliminary tests also were made on type SO-233, a low contrast aerial duplicating film, but these tests failed to show any promise for this material. Also the type SO-107, special high definition aerial duplicating film, was not tested because it would require special treatment and was not considered a good candidate for reversal processing. The above film types have been redesignated as follows:

Type 4400 is now 3400
Type 4401 is now 3401
Type 4404 is now 3404

The processing time, through the final fix, ranges between $6\frac{1}{4}$ minutes to $8\frac{1}{4}$ minutes, depending on the film type. In general "printing speeds" are higher in reversal processing for film type 8430; this amounts to about two stops.

The fog density for reversal processing is somewhat higher (0.04 to 0.08 density units) than for regular processing this results in an apparent reduction of contrast, (not necessarily detrimental). In general, reversal processing more nearly holds duplicate negative midrange-densities to the original contrast. One important (and perhaps dis-advantageous) characteristic of reversal processing of duplicate negatives is that they represent the mirror image of the original, and must be viewed through the base for correct orientation.

CONCLUSIONS

This study was rather extensive covering a time period of slightly over twelve months and costing a little over [redacted] It has shown that there is a decided advantage in reversal processing, particularly for films having a high resolution capability.

For example:

A 2nd generation duplicate negative reversal processed on type 8430 film has almost 18% more resolution than a 3rd generation duplicate negative on the same material processed by the conventional negative-positive method. The resolving power of a 2nd generation duplicate negative from a reversal processed camera original (positive) will, when conventionally processed, be equal to or better than a 2nd generation reversal processed duplicate negative from a conventional processed camera negative. The maximum resolution is obtained by reversal processing the original camera film to a positive; the reversal processed camera film (providing a positive) has almost 100% more resolution than a 2nd generation positive provided by conventional processing; and only slightly more than 15% less than an original negative conventionally processed.

RECOMMENDATIONS

Although the sensitometric curves and analysis of reversal processed resolution targets indicate superior results by reversal processing certain films, the study was not exhaustive and with the delivery of reversal processing equipment to [redacted] in the near future we should continue these studies by conducting modulation transfer function tests and obtain empirical results by having photo interpreters evaluate the same imagery processed by both the conventional negative-positive, and the reversal methods.

25X1

[redacted]

clc

PAR-206 "Reversal Processing of High Resolution Positive Films for Duplicate Negatives".

2d Qtr Report: Study Objective submitted

Estimated Factory Costs: [redacted] 25X1

31 Jan 64: See MFR, this date, approving submitted Study Objectives.

31 Jan 64: See Memo For Asst for Adm, this date, requesting that the Contractor be authorized, by TWX, to proceed with the study.

25X1 3-4 Feb 64: [redacted] will write a detailed statement of what they intend to do.

6 Feb 64: See message dated 6 Feb 64 authorizing continuance of work

25X1 4-28-65 [redacted] is preparing new briefing charts on this

5-18-65 Revised charts received

5-21-65 Briefing charts approved with changes hand carried to [redacted] by [redacted] 5-24-65 25X1

7-6-65 Final Report Received

7-21-65 completed review and draft of memorandum on final report with recommendations

7-26-65 Received Briefing Boards.

Next 1 Page(s) In Document Exempt

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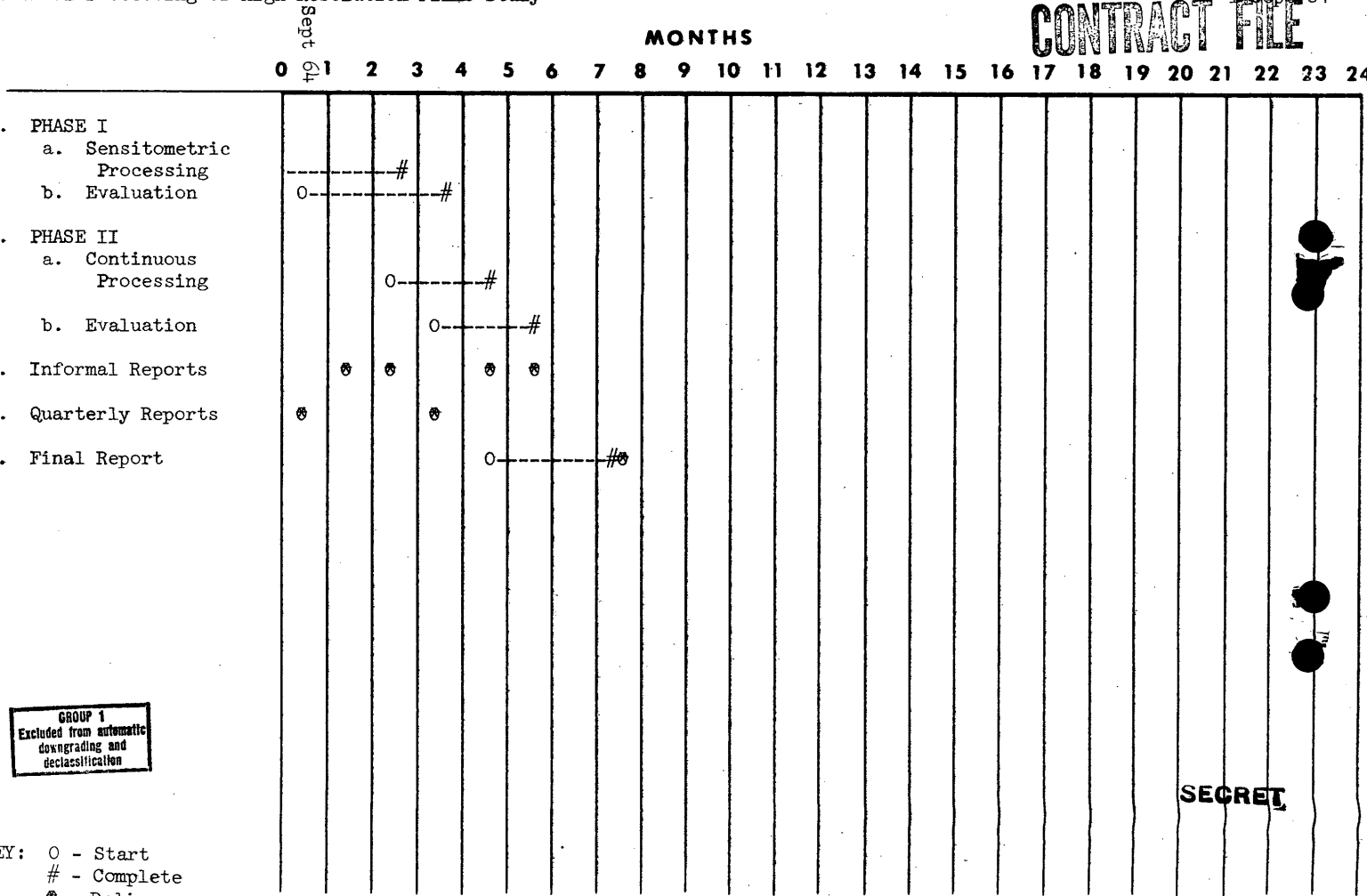
TENTATIVE SCHEDULE

PAR 206
1 Sept 64

Reversal Processing of High-Resolution Films Study



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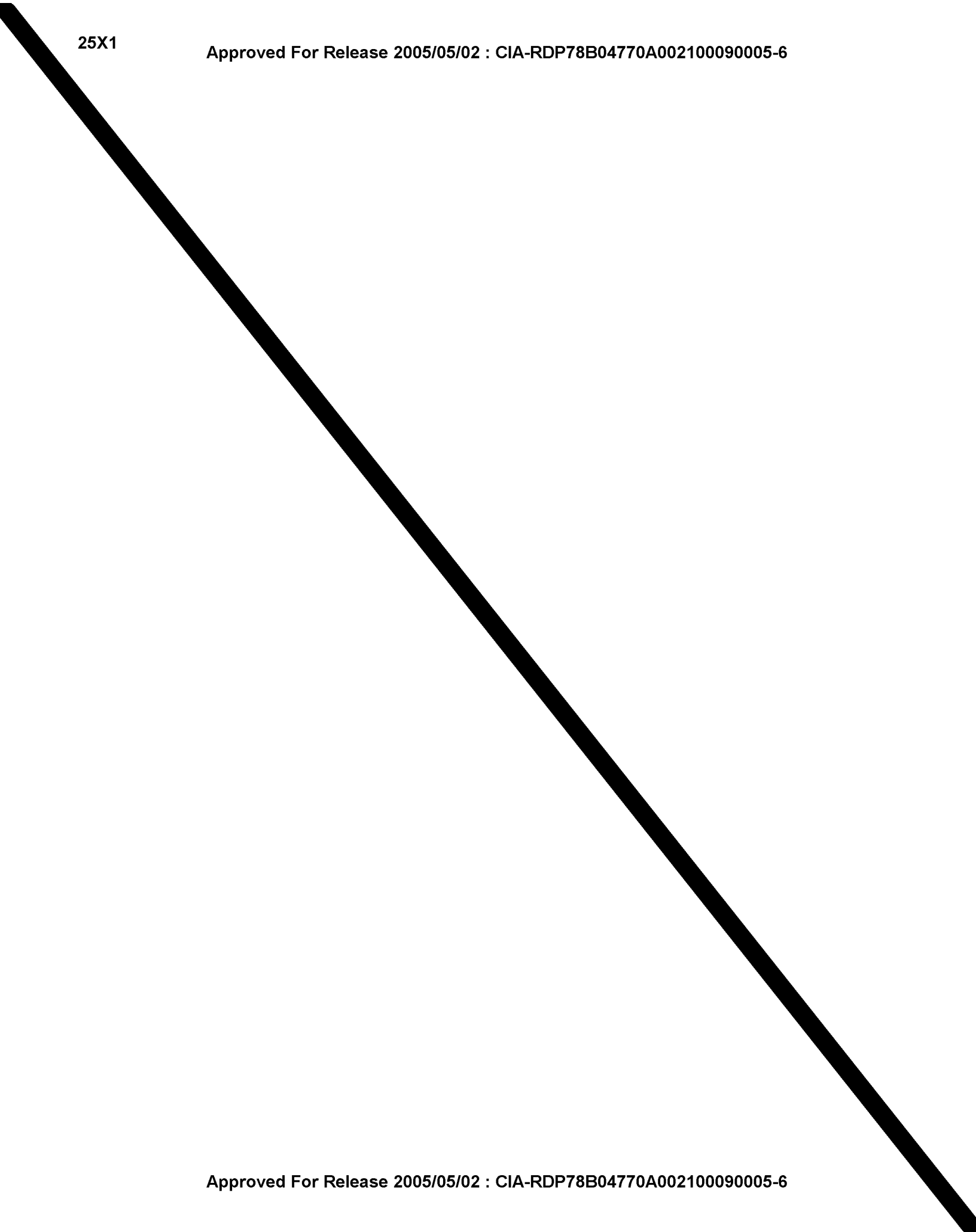

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